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in these seeds is entirely due to the coats. The delicacy of the coat is no criterion of its effect, for certainly few seed coats are more delicate than that of the upper seed of the cocklebur, yet it generally secures a delay of a year or more.

It is surprising that experimenters are so slow to see that the proper test for dormancy of an embryo is to free it from incasing membranes with aseptic precautions and then to subject it to germinative conditions. This treatment will probably show the cause of most cases of delay to be in structures surrounding the embryo. If such treatment shows real dormancy of the embryo, as in the radicle of the hawthorn,¹⁴ it is then necessary to find the particular process that is delinquent. This is certainly possible in the light of the great progress that is being made in studying the catalytic nature of protoplasmic activity. When cases of delayed germination are investigated in this way, we may hope for progress. But to assume dormancy is merely marking time and leaves the physiology of delayed germination, as it is now, more than ten years behind other phases of plant physiology.—WM. CROCKER.

Permeability.—RUHLAND¹⁵ holds entirely untenable OVERTON's theory of the permeability of protoplasm, both in its original form and as modified by NATHANSOHN. In the main RUHLAND offers the same sort of evidence as has ROBERTSON¹⁶ from the animal side. RUHLAND studied the ability of various organic dyes to enter the living cell. Malachite green and thionin, both almost insoluble in lipoids, enter the live cells readily, while rhodamin, highly soluble in lipoids, hardly penetrates them at all. He cites a number of other dye stuffs where just the opposite behavior occurs to that expected by the lipoid theory. Both the acid and basic phthaleins are highly soluble in lipoids. The former penetrate living cells readily while the latter scarcely enter at all. RUHLAND says we have no hint of a reason for this behavior. RUHLAND and ROBERTSON agree that a thin layer of lipoids often exists near the periphery of the protoplasm. They believe, however, that it is not continuous in any case, but only fills interstices of the protein matter. ROBERTSON attributes the permeable character to the nature of the outer, very sparingly soluble, protein layer.—WM. CROCKER.

Reproduction and stimuli.—FREUND¹⁷ has done a rather elaborate piece of work on the effect of external conditions upon the asexual reproduction of *Oedogonium* and *Haematococcus*. He finds that previous culture conditions determine very largely the effect of any reagent. Of the several methods he found of producing this response two illustrations will suffice to give an idea of the work. After

¹⁴ CROCKER, WM., Longevity of seeds. *Bot. GAZETTE* 47:69-72. 1909.

¹⁵ RUHLAND, W., Beiträge zur Kenntnis der Permeabilität der Plasmahaut. *Jahrb. Wiss. Bot.* 46:1-54. 1908.

¹⁶ ROBERTSON, T. B., On the nature of the superficial layer in cells and its relation to their permeability and to the staining of tissues by dyes. *Journ. Biol. Chem.* 4: 1-34. 1908.

¹⁷ FREUND, HANS., Neue Versuche über die Wirkung der Aussenwelt auf die ungeschlechtliche Fortpflanzung der Algen. *Flora* 99:41-100. 1908.